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Preliminary Report upon the Result of the Treatment of Mastitis in Dairy Cows with Penicillin

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It has been found possible in the past to reduce the incidence of clinical and sub-clinical mastitis by regular bacteriological examinations of milk samples to indicate which infected animals should be removed from the herd and which should be milked last.

Treatment by chemotherapy has altered the outlook with regard to the treatment of mastitis. Many substances have been investigated but, until penicillin was tried, none had proved to be of outstanding value. Sulphanilamide and related compounds have been used successfully on a considerable percentage of animals suffering from mastitis due to streptococci, but their extended use has shown that sulphanilamide tolerant strains are liable to develop. With the advent of penicillin, however, a new approach to the whole problem was opened.

The investigations on which we are now reporting began in 1942. Our scope was restricted for a time by the limitation of supplies of penicillin available from a development process plant, but later it was possible to make a more extensive study. The results will be published in detail in due course, but meanwhile it is thought that their encouraging character justifies a preliminary report.

During 1945-46, when a larger quantity of penicillin became available for experimental use, 64 animals suffering from streptococcal mastitis were treated with penicillin, 75 per cent. of which were cured, both clinically and bacteriologically.

A series of tests was carried out to determine the best method of administration, and these trials showed that the method of infusing the udder with 30,000 units of penicillin on two occasions at intervals of 24 hours, was the most practicable and satisfactory method.[1]

It was found that the infusion of penicillin in this concentration did not produce any noticeable irritant effect on the udder tissue and except for the presence of a few clots in the milk, which occurred on rare occasions, adverse effects were not observed. The second infusion would appear to eliminate the possibility of the continuance of infection due to organisms which may persist.[2]

Since our preliminary work upon the method of administration, several workers in America have reported that infusion of the udder with penicillin is the most effective method of treating cows suffering from mastitis.[3 4 5 6]

METHOD OF ADMINISTRATION

From 1942 to the end of 1945, the calcium salt of penicillin was used; thereafter the sodium salt. Both types of preparation were received in the form of a sterile powder, and were stored in a refrigerator. For use the material was dissolved in sterile normal saline solution or, in the later experiments, in sterile distilled water.

The present method of administration is to dissolve 120,000 units in 400 ml. of sterile distilled water, which is sufficient for treating all four quarters of the cow on one occasion. The apparatus used consists of a wide-mouthed glass container, marked in four divisions of 100 c.c., to which is attached a rubber stopper, perforated to hold two lengths of either metal or glass tubing, one of which extends to the base of the jar and the other ending just below the rubber stopper. To this short arm is attached rubber tubing, ending in two rubber pressure bellows similar to those used for inflation of the udder when treating cases of milk fever. To the long arm rubber tubing is attached, into the other end of which is plugged a teat syphon. The apparatus is sterilized before use and separate sterile teat syphons are used for each quarter of each cow. A metal clip is attached to the rubber tubing close to the milk syphon to prevent backflow of milk from the quarter after the completion of the infusion.

The most convenient time to treat an infected cow is shortly after milking. The udder and under surface of abdomen are washed with an antiseptic solution and dried. The teats are then stripped into a bucket containing antiseptic solution and each teat is swabbed with spirit. After infusion penicillin is allowed to remain in the udder until the cow is next milked. Twenty-four hours later the same procedure is carried out.

It has been found that 75 per cent. of the animals treated have remained free from infection, including one or two cases which had been infected for over twelve months, in spite of the fact that many of those treated had proved to be resistant to other forms of treatment for several months

Large doses of penicillin have been administered to cows which failed to respond to the above method of treatment, and in some cases 120,000 units have been used on each quarter of each cow, without clearing up the infection.

INTERMITTENT TREATMENT

One animal which had been infected for 18 months with *Str. agalactiae*, and whose milk always contained these organisms 14 days after treatment, even when a dose of 120,000 units of penicillin per quarter had been given on two successive days, responded when treated with 30,000 units at 24-hour intervals on two successive days, followed by remission of treatment for two days. This procedure was repeated twice more as follows:—

Two days—treated with penicillin.
Two days—no treatment.
Two days—treated with penicillin.
Two days—no treatment.
Two days—treated with penicillin.

The milk from this animal was examined bacteriologically on four occasions at weekly intervals, after completion of this method of treatment, and remained free from infection.

In our hands penicillin has been highly successful in the treatment of cows suffering from streptococcal mastitis. At least 75 per cent. of all cases suffering from this type of the disease have been successfully treated, the assessment of the value of the treatment being judged according to the result of four bacteriological examinations of milk samples at weekly intervals after treatment.

Experimental work is being carried out to determine whether it is possible to treat successfully the relatively small percentage of cases of *Str. agalactiae* which fail to respond to the routine treatment we have adopted.

For practical purposes it would appear that 25,000 units is an effective and practical dose for routine treatment. (The present standard penicillin pack is one of 100,000 units.)

STAPHYLOCOCCAL MASTITIS

Experiments are in progress upon the treatment of this form of mastitis and it would appear that larger dosage may be necessary for the successful control of this disease.

MASTITIS DUE TO *C. pyogenes* (Summer Mastitis)

The treatment of summer mastitis in dry cows according to the method described under streptococcal mastitis, has not proved to be successful. Research in the control of this type of the disease is being pursued but up to the present no quarters have been treated with complete success.

Summary

Sixty-four cases of cows suffering from streptococcal mastitis have been treated with penicillin by udder infusion, using 30,000 units per quarter on two occasions at intervals of 24 hours. Seventy-five per cent. of the cows have been successfully treated, the assessment of cures being made from the results of at least four bacteriological examinations of post-treatment milk samples.

There are indications that an intermittent form of treatment with penicillin may succeed when the ordinary routine procedure fails to clear up the infection.

In treating cases of staphylococcal mastitis it may be necessary to use larger doses of penicillin and to prolong the treatment. This is being further investigated.

Mastitis Due to C. pyogenes.—Success has not been obtained in the treatment of this form of mastitis, even when a large dose has been used in early cases.

(*Concluded at foot of col.* 1, *page* 476)

The Intramammary Therapy of Bovine Mastitis*†

The purpose of this report is to point out the value and limitations of intramammary therapy and to summarize results obtained in controlled investigations on each of the chemotherapeutic and antibiotic agents available for use in the treatment of bovine mastitis.

Less than a decade ago, all forms of bovine mastitis were considered incurable, but research in recent years has shown that some infections of the bovine udder are vulnerable to treatment by intramammary infusion of certain chemotherapeutic and antibiotic agents. Pharmaceutical companies have been quick to place these products on the market, sometimes before adequate research data were accumulated. The various "mastitis cures" now available commercially are not equally effective and some are decidedly irritating. Promiscuous use without guidance as to choice of agent and without the development of an adequate herd programme for mastitis control will lead to disappointment in results obtained and may place mastitis therapy in disrepute among dairymen.

Mastitis is a general term used to designate any inflammatory condition of the udder and, without question, it is the most prevalent disease among dairy cows. Although exact data are not available for every section of the country, it can be stated without exaggeration that a minimum of one out of every four cows is affected in some degree. The disease is least troublesome in small, well-managed dairies; in larger herds, where chances for its spread are greater and individual attention to cows is often lacking, it has become of prime importance. Financial losses accrue from reduction in quantity and quality of milk, additional labour required for special handling of diseased udders, early slaughter of cows as a result of mammary tissue destruction, and need for raising or purchasing additional replacements.

The primary cause of mastitis is an infection of the udder with pathogenic bacteria. However, injuries, improper milking, exposure to inclement weather, and other faulty management practices play a significant role in predisposing the udder to infection or in aggravating the disease after it becomes established. Several species of bacteria have been incriminated as causative agents, but the organisms classified as streptococci are the most important. The specific organism called *Streptococcus agalactiae* is responsible for the majority of cases of the commonly occurring, readily apparent, chronic form of mastitis. By application of available information on diagnosis, prevention of infection, and treatment, *Str. agalactiae* infection can be controlled. In general, investigators agree that from 50 to 90 per cent of udder infections with this organism are curable.

In some herds, staphylococci are found in the milk from as high as 30 to 40 per cent. of the cows. The mastitis produced by these infections is usually so mild that the milker is seldom aware of its presence. In some cows, however, staphylococcal mastitis assumes a more pronounced clinical form which simulates chronic mastitis caused by *Str. agalactiae* and, infrequently, a severe acute mastitis develops. This is characterized by much swelling, pain, scanty, abnormal secretion associated with a generalized toxaemia, resulting in loss of appetite and an elevation of body temperature. The affected quarter either becomes gangrenous and drops off or the swelling eventually subsides, leaving a shrunken quarter. In some instances the toxaemia is so severe that death of the cow ensues. Other species of bacteria may cause acute mastitis, but staphylococcus is the most frequent offender in this form of the disease. Knowledge is limited concerning the origin, the mode of spread, and the methods for control of staphylococcal mastitis. A few research workers have claimed cures against chronic staphylococcal mastitis, but the majority of reports show such infection to be exceedingly difficult to eliminate from the udder.

Value and Limitations of Mastitis Therapy

The many investigators who have found intramammary therapy an effective weapon against chronic streptococcal mastitis have, with one accord, emphasized the importance of using the procedure only as an adjunct to a well-planned, mastitis-control programme based on accurate diagnosis, segregation of infected cows, and the use of sanitary milking practices. Unless mastitis treatments are employed in this way, little hope can be held for success in the eventual eradication of the disease from a herd.

In order to obtain the greatest benefit from intramammary infusions, early detection of infection and identification of the causative agent, by bacteriologic procedures, are of unquestionable importance.

Administration of Udder Therapy

Regardless of the material injected into the udder, the quarter should be milked out thoroughly beforehand to avoid the immediate dilution of the therapeutic agent.

All equipment which comes in contact with the therapeutic agent or the teat canal must be sterile and free from foreign matter. The teat must be washed free of dirt and a suitable disinfectant applied to the external opening of the canal, immediately before the teat cannula is inserted. If several quarters are to be treated, a separate sterile cannula should be employed for each quarter.

Chemotherapeutic Agents

Neutral Acriflavine.—This is a coal-tar derivative. It is irritating for mammary tissue and may cause irreparable damage if solutions which are too concentrated are employed. This agent was first used on a large scale in dairies in Switzerland, while later investigations conducted in the United States resulted in certain modifications in dosage and administration. The usual procedure followed in this country is to dissolve the active principle in 700 c.c. of sterile vehicle (20 per cent. dextrose or 20 per cent. sucrose, in water) to make a 1:1,500 dilution. A preliminary rinse of 200 c.c. is infused and withdrawn. This is immediately followed by the injection of 500 c.c. The principal infusion is left in the gland for periods varying from five to 60 minutes, depending on the concentration of neutral acriflavine and the nature of the vehicle employed. When indicated, treatment may be repeated in seven to 14 days.

After the principal infusion has remained in the quarter for the optimum period, a complete milking-out of the solution must be attempted or an undesirable irritation may result. A hypertonic sugar solution favours complete withdrawal of the entire volume of the infused fluid—thus, it is possible to increase the concentration of the dye without danger of added irritation. In the treatment of a group of quarters representing every stage of infection with *Str. agalactiae*, little more than 50 per cent. of cures• can be expected following one to three infusions given from seven to 14 days apart. With lactating quarters, the milk is often yellow for several days and visible particles may occur for as long as ten days after an infusion has been given. Neutral acriflavine may be used on the dry gland, but it is advisable to avoid concentrated aqueous solutions, as it is seldom possible to withdraw a great quantity of the infused fluid after the elapsed time interval; excessive irritation may result from retention of a concentrated solution.

Neutral acriflavine has not shown any significant results in the treatment of *Staphylococcus aureus* infections of the udder.

Silver Oxide.—Five per cent, silver oxide in mineral oil—so-called colloidal silver oxide—is described by the manufacturers as an extremely fine suspension of silver oxide in mineral oil. The small size of the silver particles—approximately one-eighth as large as a red blood corpuscle—is supposed to favour dispersion of the silver throughout the udder and to render it readily available for deep penetration of the tissues. That favourable therapeutic action is not necessarily dependent upon the minute size of the silver oxide particles is indicated by the fact that treatment has been equally successful with suspensions prepared by simply grinding silver oxide in a mortar and slowly adding sterile mineral oil in sufficient quantity to make a 5 per cent. suspension of the silver oxide.

In the treatment of the lactating udder, 10 c.c. of 5 per cent. silver oxide in oil is injected per quarter on three successive days. This chemotherapeutic agent is the most irritating of those now in use for the treatment of mastitis. Infused quarters become oedematous, sensitive to the touch, and the secretion becomes thick, contains many clots and shreds, and assumes a grey colour. The milk often

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• The interpretation of the term "cures," as used in this report, is given in paragraph 24 of the summary.

References

(1) Weibrether, F. J., Jasper, D. E., & Peterson, W. E. (1945.) *Proc. Soc. exp. Biol.* 59. 282.
(2) Bigger. (1944.) *Lancet*. 2. 497.
(3) Slanetz, L. W., & Allen, F. E. *J. Amer. vet. med. Ass.* 107. 18.
(4) Bryan, C. S., Norwood, R. E., Hoffman, C. F. (1945.) *Vet. Med.* March. p. 87.
(5) Kakavas, J. C. (1944.) *N. Amer. Vet.* 25. 408.
(6) Klein, L. A., Crisman, D. W., & Moor, J. W. *Amer. J. vet. Res.* 6. 3.

remains visibly abnormal for five to ten days and production frequently decreases as much as 50 per cent., seldom returning completely to the pretreatment level for the remainder of the lactation. Infrequently, irritation is so severe that scar tissue forms in the teat canal and large ducts, with resultant partial to complete occlusion. The percentage of cures from *Str. agalactiae* infections in lactating quarters varies from 35 to 80. Because of its irritating properties, silver oxide in oil is not the therapeutic agent of choice for use on the lactating gland.

The effectiveness of silver oxide in the dry udder has received considerable study. A single injection is given and left in the gland. For the dry udder of average size, 10 c.c. is employed, while with very small glands 5 c.c. is adequate and advisable. With quarters showing swelling and containing a purulent exudate, the dose may be increased to 12, 15, or 20 c.c., the volume given to be determined by the size of the quarter and the quantity of purulent exudate removed. Following treatment, some oedema and soreness develop, but this is not objectionable and often recedes in a few days. In recent infections with *Str. agalactiae*, as high as 85 per cent. cures have been obtained following a single injection, while in the treatment of more chronic infections, the level of cures ranges between 50 and 60 per cent. Data are available to indicate that treatment is most efficient when given early in the dry period. The injection of silver oxide into the dry gland is not without danger of producing tissue injury, for approximately 3 per cent. of the treated quarters may be expected to become nonfunctional as a result of closure of the teat canal by overgrowth of scar tissue.

In spite of the irritating properties of silver oxide in mineral oil, application of it may be made, as a last resort, in the case of quarters harbouring *Str. agalactiae* infections which have failed to respond to infusions of less irritating therapeutic agents. No data have been published which claim silver oxide in oil to be effective against *Staph. aureus* infections of the udder.

Phemerol.—Phemerol is a 1 : 1,000 aqueous solution of quarternary ammonium compound. In quarters shedding *Str. agalactiae*, with little or no induration, a dosage of 75 c.c. per quarter, may cure up to 86 per cent. of the affected quarters, whereas udders with marked indurative changes do not respond. A transitory thickening of the mucous lining of the teat and milk cisterns, associated with an abnormal secretion, is observed in most cases for varying periods after medication. The greatest reduction in milk flow, as a result of the infusion of phemerol into the udder, occurs in cows in the early stages of lactation. It is recommended, therefore, that use of this agent be limited to infected cows near the end of their lactation period.

Sulphanilamide.—The first studies with sulphanilamide in the treatment of mastitis were limited to the drug given by mouth. It was soon discovered that large quantities, administered over a period of several days, were required in order to obtain an appreciable clinical effect. The oral administration of sulphanilamide cannot be recommended as a routine method for removal of *Str. agalactiae* from the udder, but it has a definite place in the treatment of the associated clinical symptoms. An initial dose of 1·5 gr. per pound of body weight, followed by one half that dosage at intervals of 12 hours for several days may be given. However, this dosage of sulphanilamide may prove toxic for some cows. A developing toxicity is manifested by general sluggishness, loss of appetite, and drop in milk flow. When these symptoms develop, the administration of sulphanilamide should be discontinued.

Sulphanilamide given by mouth is rapidly eliminated by the kidneys, and only a fraction reaches the mammary glands. Therefore in order to obtain a high concentration within the udder, it is more logical to infuse it into the organ. For intramammary infusion, sulphanilamide is suspended in a light mineral oil, and the commercial products contain between 35·0 and 37·5 per cent. A dosage of 45 to 50 c.c. per quarter is recommended to be given daily for four days. If the infection persists after one course of treatment, the injections should be repeated, using 80 c.c. per quarter. Some investigators, on the other hand, claim that a higher dosage of from 100 to 120 c.c. is preferable.

Sulphanilamide in oil is relatively non-irritating for mammary tissue; thus it can be infused into lactating or dry glands without danger of lowering production or causing tissue injury. It is a valuable therapeutic agent for reducing clinical symptoms caused by either streptococcal or staphylococcal infections. The investigators responsible for its development and use have stated that over 90 per cent. cures were obtained in *Str. agalactiae* infections, and that this agent was also effective in removing *Staph. aureus* from the udder. Reports by others reveal as low as 36 to 35 per cent. cures from *Str. agalactiae* following four injections on successive days, and no decided advantage over any other therapeutic agent was found in the removal of staphylococci from infected quarters.

Sulphanilamide infusions, while not always effective in removing *Str. agalactiae* from the udder, do, however, produce a considerable reduction in the number of organisms shed in the milk for a variable period following treatment. A residual infection may be overlooked if searching bacteriologic methods are not employed in determining results of treatment. Differences in bacteriologic methods used by the various investigators may explain, in part, the wide divergence in percentage of cures claimed.

U. S. B. and Reazol Solutions.—U. S. B. solution consists of urea 8·8 per cent., sulphanilamide 8·8 per cent., and benzyl alcohol 3·0 per cent., in an aqueous base composed essentially of propylene glycol.

Reazol: Same formula as for the U. S. B. solution, except that the sulphonamide content consists of 4·4 per cent. of sulphanilamide and 4·4 per cent. of sulphathiazole.

These preparations are not too irritating in the udder. Following treatment, the milk may be abnormal in appearance for a period of from two to five days. It would seem that in the treatment of chronic streptococcal mastitis, these agents have about the same efficiency as sulphanilamide in oil. Usually, the dosage for a single treatment is 25 c.c., and for repeated treatments in which the drug is administered on three successive days, the dosage is 18, 10, and 5 c.c., respectively.

Iodine.—Iodine incorporated in mineral oil has been suggested for the treatment of mastitis by intramammary infusion during the dry period. A concentration of 1:1,250 of iodine in 500 c.c. of oil is injected into dry quarters and allowed to remain throughout the dry period. In advanced cases of infection, the quarter should be stripped out in ten to 15 days and the treatment repeated. It also has been advocated that a combination of iodine (1:2,000) and sulphanilamide (28·3 per cent.) be used for intramammary infusions. Three or four injections of 50 to 75 c.c. each per quarter are to be given at daily intervals. This treatment may be used on lactating, as well as dry, quarters. Since reports on the efficacy of these agents in the treatment of mastitis are limited, it is not possible to evaluate them.

Antibiotic Agents

Tyrothricin and Gramicidin.—These are antibiotic agents obtained through the growth of the common soil micro-organism, *Bacillus brevis*, in special culture mediums. Extracts of such cultures are called tyrothricin, and from it, two crystalline products, tyrocidin and gramicidin, can be separated. Tyrocidin is so toxic that it has not been used commercially. The purified product, gramicidin, has a higher bactericidal action against *Str. agalactiae* than tyrothricin. However, up to the present, the cost of production has restricted the use of gramicidin to experimental studies, whereas commercial preparations of tyrothricin have been extensively used in the field for the treatment of bovine mastitis. Tyrothricin appears on the market under several trade names, in either aqueous or oil vehicles. The dosage is determined on the basis of milligrams of tyrothricin per cubic centimetre of vehicle. Some of the commercial products contain 2 mg. per cubic centimetre, while others have only 1·0 or 1·5 mg. per cubic centimetre.

For best results, the dosage of tyrothricin should be adjusted to the size and activity of the quarter to be treated, *i.e.* 80 mg. for small quarters, 120 mg. for medium-sized quarters, and 160 mg. for large quarters. Various investigators have reported between 45 and 95 per cent. cures in lactating quarters from *Str. agalactiae* infections, following infusions with tyrothricin. The marked difference in percentage of cures obtained by various workers can be attributed in part to differences in dosage, severity of cases selected for treatment, and bacteriologic techniques employed for determining results of treatment.

Tyrothricin is moderately irritating for mammary tissue; therefore, a variable degree of swelling and abnormal condition of the secretion results from infusion of lactating quarters. Severe tissue injury may result from an overdose; thus, care should be taken in determining the volume to be employed for each quarter.

The use of gramicidin or tyrothricin in dry udders has not been extensively reported in the literature. However, results that have been published indicate that more cures are obtained in dry, than in lactating, quarters. Tyrothricin has an advantage over silver oxide for dry cow treatment in that it is less irritating—thus, permanent tissue injury is not apt to occur. For the average-sized dry gland, 80 mg. is adequate, while with very small quarters less should be infused.

Penicillin.—This antibiotic agent is produced by the mould, *Penicillium notatum*, and, like tyrothricin, it is effective principally against the Gram-positive pathogens. It was discovered as early as 1929; and although it was not isolated in purified form at that time, its usefulness in the treatment of local infections caused by penicillin-sensitive bacteria was demonstrated. In 1939, when the antibiotic agents, tyrothricin and gramicidin, were isolated, this stimulated interest in the entire field of antibiotic agents, and penicillin again received attention. Investigators at Oxford University devised methods for obtaining it in purified form and in sufficient quantities for trials on infections in man. This pioneer work demonstrated that purified penicillin is a powerful antibacterial agent of low toxicity. The Armed Forces of the United Nations became

interested in penicillin for use in controlling infections in war wounds, and, under this stimulus, large-scale commercial production was undertaken in the United States.

In 1945, penicillin was released for use in veterinary medicine; immediately, intensive research on its possible application in the treatment of bovine mastitis was started. It is marketed as the sodium or calcium salt of penicillin; either form is satisfactory for use in the treatment of mastitis. The dosage is measured in Oxford units, and the standard vial contains 100,000 units in the form of a dry powder. In the dehydrated form, penicillin will maintain its potency for many months if kept at a temperature of 50° F., or lower. For udder infusions, the penicillin is dissolved in a sterile, fluid vehicle such as distilled water or physiological saline solution. Penicillin in solution loses its ability to destroy bacteria in a few days, even when stored in the refrigerator. For this reason, it should not be dissolved in the vehicle until immediately before use, and any portions of the solution which must be held over for later injection must be kept below 50° F. and used within 60 hours.

Suspensions of penicillin in mineral oil have been prepared and used experimentally. They are more stable than water solutions and may be stored in the refrigerator for several weeks without an appreciable loss in potency. Oil suspensions, however, must be heated to body temperature and must be shaken before use.

With water or saline solutions, the possibility of irritation from the vehicle is reduced if the volume does not exceed 50 c.c., and even smaller quantities than this may prove effective. In the treatment of dry glands, a 50 c.c. volume may be more suitable than smaller amounts, for it enhances the distribution of the penicillin throughout the cistern area. Some workers are of the opinion that mineral oil suspensions of penicillin may be less irritating than water solutions and more effective when the volume injected is increased to 100 c.c.

Penicillin-sensitive bacteria are not immediately destroyed by contact with this agent, but several hours' exposure is required. In the treatment of mastitis, an adequate concentration of penicillin must be maintained within the infected quarter for a sufficient period of time to result in complete destruction of the infecting organisms. Milk does not inhibit the bactericidal action of penicillin against *Str. agalactiae* other than to reduce its efficiency when too great a dilution occurs in a heavily producing udder.

There is a wide variation in the dosage of penicillin used by different workers, and the results reported are based on too few animals to permit, at this time, specific recommendations for use of the drug under average field conditions. However, available information indicates that the amount of penicillin required to eliminate *Str. agalactiae* from the udder varies over a wide range, depending upon the stage of infection, size of the udder, and volume of milk produced. In early or mild infections, quarters receiving as little as 1,000 units have responded to treatment; whereas, in chronic cases with large udders, the use of 100,000 or more units may be required to accomplish cures in a reasonable percentage of cases.

On the basis of present knowledge, it appears that under average herd conditions the infusion of from 25,000 to 50,000 units of penicillin in water per infected quarter, once a day for four consecutive days, is adequate to produce a cure in the majority of cases of *Str. agalactiae* infections. If a one-injection treatment is used, it appears that 100,000 units in 100 c.c. of vehicle (oil or water) may eliminate *Str. agalactiae* from about 75 per cent. of the quarters treated. In order to prolong the presence of penicillin in the udder, it may be desirable to skip one milking when a single injection is used. There are no contra-indications other than that, in cases of mastitis caused by bacteria not sensitive to penicillin, little benefit will result from its use.

Penicillin shows greater promise of effectiveness against *Staph. aureus* infections of the udder than any of the other therapeutic agents now in use. However, the staphylococci are much more resistant to penicillin than the streptococci and, therefore, the dose levels effective against *Str. agalactiae* are not so efficacious against *Staph. aureus*. It is anticipated, however, that studies now in progress will reveal procedures for use of penicillin which will give maximum results against staphylococcal udder infections.

Summary

(1) *Is bovine mastitis a problem of the individual cow or of the herd?* It is a problem of the herd. A survey should be made in each herd to determine the incidence of infectious mastitis, and the extent to which environmental conditions and management practices are contributing to the spread of infection, and to the occurrence of non-infectious mastitis.

(2) *Where udder medication is contemplated, is it essential that a strict mastitis-control programme be adopted for the management of the herd?* Yes. Barring injuries, when infectious mastitis is prevalent in a herd, it simply indicates that management, supervision, and sanitation have been lax. Thus, the herd operations should be so adjusted as to control or prevent the spread of the infection. After quarter samples of milk from the entire herd have been bacteriologically tested, the cows should be grouped in the stable according to the results of the laboratory tests of the milk and physical examinations of the udders. Cows with normal udders that are free from infection should head the milking line, with mild or early cases of the disease to follow, while advanced, chronic cases should be segregated in another barn or at the end of the milking line, away from the non-infected individuals. Starting with the normal animals, the cows should be milked in the order of their standing in the barn and any new additions should be free from infection. It is most essential that strict sanitary measures, as recommended by the veterinarian, be adopted and that the entire herd be retested at intervals of from 30 to 90 days until it is completely free from *Str. agalactiae* infection.

(3) *Is it necessary to examine, bacteriologically, the secretion from obviously affected quarters before the treatment is begun?* Yes. Although, following treatment, the character of the milk may be temporarily improved, it is a waste of labour and money to treat cases of mastitis solely on clinical changes occurring in the udder and on visible changes in the appearance of the milk, for some of these udders are not infected. The gland may be atrophied or contain scar tissue (hard lumps), and the secretion may be abnormal in appearance as the result of a previous infection, injury, sickness other than mastitis, hormonal disturbance such as may occur preceding abortion, or changes which occur in the udder during early and late lactation.

(4) *What cultural tests are of practical use for the diagnosis of mastitis?* A combination of the Hotis test and the microscopic examination of incubated milk films provides a most useful and searching test for field use. With very little equipment, it is possible for the veterinarian to render a worthwhile diagnostic service to the dairyman in eradicating mastitis if these tests are applied to the milk from separate quarters of individual cows. However, where possible, it is recommended that a laboratory service, supported by the State, be provided.

(5) *During or after treatment is it necessary to apply bacteriologic tests to the milk to determine whether a cure has resulted?* Yes. The freedom from flakes and improvement in the macroscopic appearance of the milk is no assurance that the quarter has been freed of its infection. There may be a temporary improvement without complete elimination of infection. If the infection is allowed to persist, further destruction of the secretory tissue will occur.

(6) *Is treatment more effective in lactating udders than in dry udders?* No. Experience has shown that the best results are obtained from intramammary infusions administered in late lactation or during the dry period. This is true because the infected tissues are concentrated, due to shrinkage of the gland; little or no dilution of the active agent occurs as a result of secretory activity, and, since milking at regular intervals is not required, the active agent can be left in the udder for a longer period of time. When treatment must be given to lactating udders, it should be realized that repeated injections may be required to produce a high percentage of cures. With the more irritating therapeutic agents, a reduction of milk flow often follows treatment. When a single infusion is made, this usually is temporary, but with repeated injections during lactation, production seldom returns to pretreatment level for the remainder of that lactation.

(7) *Are repeated treatments indicated in lactating udders?* If cows in full milk yield do not respond to a reasonable number of treatments, further medication should be discontinued until they are dry. Repeated treatments may excite the irritation already existing in the quarter, resulting in an acute attack of mastitis.

(8) *Is it important to select the cases of mastitis for udder medication?* Yes. Newly or lightly infected udders respond much more readily to udder therapy than advanced, chronic cases, where much of the secretory tissue has been replaced by scar tissue (induration-fibrosis). Treatment is expensive, hence infected cows with badly damaged udders or cows which are poor producers should be sold for slaughter.

(9) *In udder therapy, is water a more desirable vehicle than oil?* No. A water solution is easier to handle in the field, especially when neutral acriflavine and penicillin are employed. An oil preparation, on the other hand, has certain advantages in that (*a*) the oil may be less irritating than sterile water or physiological saline; (*b*) it may be soothing to the irritated tissues; (*c*) following a single injection, the oil may be retained in the cistern for several days and thus retard the growth of the streptococci; and (*d*) the therapeutic agent injected may be released more slowly and thus prolong its curative action. A disadvantage of an oil preparation, however, is that it is more difficult to inject and, unless the equipment is

thoroughly cleaned immediately after use, any rubber attachments deteriorate rapidly. It is recommended that with oil preparations of the sulphonamides and penicillin, a syringe with a rubber plunger be used. Other agents suspended in oil, which do not settle out, can be injected with an all-glass syringe.

(10) *Is there an individual variation in the response of the udder to the introduction of chemotherapeutic agents?* Yes. No one can predict how the udder will react to the administration of a chemotherapeutic agent. Some cows, with mild or chronic infections, may react severely and develop acute symptoms, whereas other cows with similar infections may show little, if any, reaction. Agents like sulphanilamide and penicillin, which usually are non-irritating to the udder, may cause a severe reaction in the udders of some cows.

(11) *Should treatment be applied to quarters which yield milk that is bacteriologically positive but normal in appearance?* Yes. If treatment is delayed until clinical symptoms appear, extensive damage to the milk-secreting tissue may result; the chances for eliminating the infection are reduced, and the animal concerned serves as a source of infection to other cows, even though her milk appears to be normal.

(12) *Is it advisable, in the absence of infection, to treat quarters in which the secretion appears normal but has a high cell count and alkalinity (positive brom-thymol blue reaction)?* No. The change in the *p*H reaction (positive brom-thymol blue test) of the milk may not be associated with infection. The quarter may have been injured or irritated and nature (leucocytosis) is simply attempting to repair the damage. The introduction of a therapeutic agent at this time may bring on an acute attack of mastitis, often resulting in a blind quarter. These cases should be regarded as suspicious until it is shown definitely by repeated cultural tests that they are free from infection.

(13) *Is it advisable to treat udders with injured teats?* Yes. When the teat is injured, daily injections of penicillin, sulphanilamide in oil, or tyrothricin may prevent infection while the wound is healing.

(14) *Is udder therapy indicated in acute cases of mastitis?* This is a debatable question. In acute mastitis, the secretory tissue is severely involved so that any material injected into the udder should be non-irritating; otherwise, udder therapy may result in complete destruction of the glandular tissue. Moreover, when the udder is severely congested and the secretion is scant, it is obviously impossible for any agent injected into the milk cistern to reach more than a very small portion of the quarter. Repeated injections of a non-irritating agent, if combined with other measures to reduce the congestion, may be helpful in some cases. Usually, when acute cases of gangrenous mastitis, often referred to as "blue bag," are detected, the infection has progressed so far as to destroy much of the secretory tissue so that, if the animal recovers, the affected quarters may no longer function properly. Nursing and symptomatic treatment as prescribed by the veterinarian may be most beneficial.

(15) *Should cows with mastitis be rested during treatment?* Yes. If lactating cows are segregated from the milking line and maintained on a low producton diet in order to rest the udder, they seem to respond more favourably to udder medication.

(16) *Should special precaution be taken in the milking of cows while under treatment?* Yes. It is desirable to hand-milk these cows so that the dairyman can more closely observe unfavourable changes in the udder and secretion.

(17) *How long after udder medication should the milk be discarded?* In all instances, the secretion obtained at the first milking following treatment should be discarded, and in subsequent milkings as long as the foremilk is abnormal in appearance.

(18) *Are some of the therapeutic agents more suitable than others for the treatment of lactating or dry udders?* Yes. In lactating udders, penicillin is the least irritating but usually repeated treatments are required. Various preparations of tyrothricin, although more irritating, are not objectionable. Apparently, some agents which are irritating in lactating udders usually produce little, if any, reaction in the dry udder.

(19) *Are the various therapeutic agents now available for udder medication more effective in curing mastitis caused by* Streptococcus agalactiae *than infections caused by other micro-organisms?* Yes. Apparently, more cases of mastitis caused by *Str. agalactiae* respond to treatment than mastitis infections attributed to other kinds of streptococci, staphylococci, and coliform organisms.

(20) *With the use of improper instruments and the careless administration of udder therapy, is it possible to convey bacteria into the udder and reinfect the gland with foreign organisms?* Yes. Agents used in udder therapy are selective in their action. While they are highly effective against certain pathogenic bacteria, they have little or no ability to destroy others. An outbreak of udder tuberculosis has been reported which was attributed to the irrigation of a number of quarters on the same day, with the same apparatus. If it is possible to convey tubercle bacilli to the udder through the medium of udder irrigation, it seems quite probable that other bacteria such as coliform organisms, *Brucella abortus*, etc., might be transmitted in the same manner.

(21) *Should udder medication be administered only by a veterinary practitioner?* Yes. He can determine by a thorough physical examination of the udder and its secretion whether the cow is suitable for treatment. Extreme care should be exercised in the preparation of the teat and the instruments to avoid contamination, injury, and the possibility of conveying miscellaneous bacteria into the gland. Moreover, any fluid injected into the udder should be at body temperature. Thus, in cold weather, improperly tempered solutions can be irritating. The infusion of therapeutic agents into the udder should be done only by persons who have been trained in the preparation and handling of sterilized materials and who have an understanding of the physiology of the udder and of the nature and limitations of the product chosen for injection.

(22) *Should the udder be massaged after each injection?* Yes. Regardless of the quantity of material administered, the lower portion of the quarter should be thoroughly massaged following each injection to facilitate distribution.

(23) *In the average dairy herd, what percentage of cures can be anticipated with the various agents now available for udder medication?* The efficiency of any kind of udder therapy with bactericidal agents depends upon (*a*) a proper diagnosis, (*b*) care used in administering treatment, and (*c*) proper herd management. The percentage of cures will be much higher in herds under a strict mastitis-control programme (including laboratory examination of milk samples) where the advanced clinical cases of the disease have been gradually eliminated, for most of the animals presented for treatment will have mild or early infections which respond more readily to udder therapy. With some agents, 90 per cent. of the affected animals may be freed of their infection. On the other hand, in the average dairy herd, the number of cures may be much lower, possibly around 60 per cent. or less. The main reason for this lower efficiency in the average dairy herd is that little attention is being given to the actual control of the disease, or to the diagnosis of the infections. Moreover, even though the treatment may be 90 per cent. effective, it is essential that the hopelessly incurable cows be removed immediately from the herd before the successfully treated animals become reinfected. It should be borne in mind that quarters which have been cured are not immune to mastitis but remain susceptible to reinfection.

(24) *What constitutes a cure in mastitis?* The complete elimination of the disease-producing bacteria and the ability of the treated quarter or quarters to resume the secretion of normal milk. Bacteriologic tests conducted over a period of two or three months must be negative for the organism in question, before a quarter can be designated as cured. Nothing else will suffice.

(25) *Is treatment the answer to the bovine mastitis problem?* No. With udders suitable for medication, in which a diagnosis of the infection has been made, proper medication can be expected to salvage many cases of chronic mastitis and thus prolong the usefulness of cows previously regarded as hopeless. With regret, it is necessary to point out that, up to the present, treatment cannot be regarded as the answer to the problem of mastitis, for the real answer is still, now as before, *prevention of infection.*

ABSTRACT

[Penicillin in the Treatment of Bovine Mastitis. Schofield, F. W. (1946.) *Can. J. comp. Med.* March, 1946. 63-70. (5 refs.).]

The author shows that when a minimum of 25,000 units of penicillin is infused into a dry or slightly active quarter, a satisfactory level of penicillin is maintained for 24 hours. Consequently, he infuses 50,000 units daily for three days. In active quarters, he infuses this dosage of penicillin following each milking for three days. Schofield eliminated *Str. agalactiae* from quarters showing *acute* mastitis in 30 per cent. to 69 per cent. of cases. He considers that the better results obtained by some other workers are due to the fact that sub-clinical cases respond better. Cases of acute mastitis due to *C. pyogenes* and *S. aureus* respond to treatment, *provided treatment is commenced early.* The author has encountered no penicillin resistant strains of *Str. agalactiae.*

A. W. G.

Weekly Wisdom

The modern veterinarian is equal to the modern doctor, both in scientific attainment and skill, although this fact does not yet appear to be appreciated by all.—The Duke of Norfolk.

CLINICAL COMMUNICATION

Radiography of the Horse's Pastern

by

HAMILTON KIRK, M.R.C.V.S.

London

Nobody knows better than those engaged in equine practice how difficult it sometimes is to decide whether a pastern bone is actually fractured or not, whether the fracture is of such dimensions or so placed that destruction would appear the only course, or whether the damage is so slight that treatment should be persisted with. The amount of swelling or of fibrous thickening is often so great that a practitioner may be excused for hesitancy in his prognosis.

This has been emphasized in three recent cases, two of them racehorses and one a hunter. In all three there was pain, heat, swelling and lameness but, so far as I am aware, no palpable crepitus. There certainly was none in the case of the hunter.

The practitioners concerned with the racehorses were confident that fracture existed, and their diagnosis was confirmed by X-ray. Yet they were not aware of the extent or position of the fracture, and were undoubtedly interested and aided by the radiographic findings. Having examined the third case, it is not surprising that the veterinary surgeon in charge should have entertained doubts as to the exact nature of the injury. Obviously a correct diagnosis is of the utmost importance, for upon it depends the prognosis and the manner of treatment.

Not infrequently horses are insured against such risks, and any positive visual evidence which can be produced in support of one's contentions, must be of immeasurable value should one's findings be disputed.

Case 1 concerned a celebrated racehorse (the property of a Peer) which went lame during a race. There was great swelling from the coronet to the fetlock which masked the underlying condition. The diagnosis of the attending veterinary surgeons proved to be absolutely correct although they were, of course, unable to ascertain the injury in detail.

Antero-posterior and lateral radiographs revealed a longitudinal split of the os suffraginis, with displacement. A very great deal of new fibrous tissue surrounding the sesamoids is discernible in Fig. 1. The displacement of the two portions of bone is well shown in Fig. 1, but not at all in Fig. 2, although in the latter a distinct shaft of light is visible down the length of the bone.

The prognosis looked very poor and it was decided to destroy the horse.

Case 2. Here again the suffraginis was the seat of the trouble and radiographs revealed not only a vertical fracture (Fig. 3) but also a slight transverse fracture across the middle of the bone (Fig. 4). There was no displacement and, I believe, no crepitus; and although Mr. Wallace, the veterinary surgeon in charge, felt sure a fracture existed, he did not know, of course, just where it was or its extent.

The horse pulled up very lame during an exercise gallop and, after four or five weeks of rest and treatment, the owner became anxious and requested X-ray examination. The animal was eventually sold, probably for use as a stallion.

Case 3 was a two-year-old hunter in which lameness had existed for a month prior to radiography, and had resisted all orthodox methods of treatment. The original injury was a small wound on the coronet, the infliction of which had probably been accompanied by a blow. As time went on the pastern became encased in a thick layer of fibrous tissue through which nothing could be palpated. Lameness grew worse and the practitioner was undecided between a diagnosis of fracture or periostitis. The radiograph (Fig. 6) revealed intense periosteal proliferation all around the shaft of the suffraginis (better shown in the lateral view, Fig. 7) but no suggestion whatever of a fracture. Upon this finding treatment was proceeded with for periostitis. However, as lameness in due course became accentuated and the horse more and more distressed, destruction was carried out a fortnight after radiography.

Post-mortem examination of the pastern revealed that a small area of bone had been chipped in the centre of the articular surface of the os coronae at the corono-pedal joint. A hole was found in the bone at this point from which quantities of pus exuded.

It was astonishing that the films (which were of excellent quality) gave no indication whatever of this condition, and the assumption is that these bony changes had arisen during the two weeks following radiography.

Alternatively it would have needed an exposure in the direction of the length of the bone in order to have revealed a crack on the articular surface, and that, of course, would be impossible.

This experience emphasizes the fact that one must not be too reliant upon radiography in a given case, and that whilst an obvious tissue change cannot be denied, there is always a possibility of some other condition existing which is not visually revealed.

REPORTS

International Veterinary Questions

Report of Food and Agriculture Organization of the United Nations' Committee on Animal Health

The Conference, as an *ad hoc* Committee, was called by the Food and Agriculture Organization (F.A.O.) "to study international veterinary questions and report to the Annual Conference of the Organization at Copenhagen in September."

After consultations with the Director-General, F.A.O., invitations were sent to, and accepted by, the following:—

France.—Mons. Frisson, Inspecteur Général, Services vétérinaires.

India.—Dr. F. C. Minett, Director, Imperial Veterinary Research Institute, Muktesar-Kumaun.

Iran.—Dr. M. R. Rastegar, Director of Veterinary Services (observer).

South Africa.—Dr. P. J. du Toit, Director of Veterinary Services.

United Kingdom.—Sir Daniel Cabot, Chief Veterinary Officer, Ministry of Agriculture and Fisheries; Mr. T. Dalling, Imperial Bureau of Animal Health, Director, Veterinary Laboratory, Ministry of Agriculture and Fisheries; Mr. John Smith, Adviser on Animal Health, Colonial Office. Mr. R. Daubney also attended as an observer.

U.N.R.R.A.—Mr. Grahame Edgar (Senior Veterinary Research Officer, Department of Agriculture, New South Wales), U.N.R.R.A. South-West Pacific Area International Veterinary and Livestock Secretariat; Mr. C. Hopkirk. Col. Aselmeyer and Mrs. Markley also attended as observers.

U.S.A.—Dr. H. W. Schoening, Chief, Pathological Division, Bureau of Animal Industry, Agricultural Research Administration, U.S. Department of Agriculture.

Office International Des Epizooties.—Professor G. Flückiger, President; Mons. E. Leclainche, Director.

Dr. Sylvio Torres (Brazil) accepted an invitation but was unable to attend.

The following were unable to send representatives or to attend personally: U.S.S.R.; China; Col. Max Henry, U.N.R.R.A., S.W.P.A. Secretariat; Col. Todd, Allied Military Command.

The Conference was guided in its deliberations by the acute necessity to increase the food supplies of the world, particularly food products of animal origin, and the realization that veterinary science can contribute materially in alleviating the present state of affairs. The wastage from the principal epizootic diseases throughout the world is known to be enormous, but the ravages of the widespread insidious diseases are probably no less serious. With regard to the latter, it has been estimated, for example, that the losses due to mastitis, brucellosis and infertility of cattle alone in Great Britain amount, on a conservative basis, to £17,000,000 annually. Further, the Conference would direct attention to the effect of animal diseases on agricultural production in those extensive parts of the world where oxen, buffaloes and other animals are used in agricultural operations.

The Conference emphasized the essential need for action on the widest international lines in order to eradicate the major plagues and to reduce the losses due to other diseases. It envisages collaborative action in research into veterinary problems, and co-operative trials and use of new products for the control of disease in order to obtain an early assessment of their value in different countries and under varying conditions. Similarly, in the administrative field joint action between countries concerned in any particular campaign was deemed indispensable.

In this connection, the Committee considered some of the principal epizootic diseases and reviewed in some detail the subject of rinderpest. It came to the conclusion that rinderpest still represents a major menace to the world's supply of food and felt that every effort should be made to eradicate the disease completely where it exists in enzootic form. The Conference noted with the liveliest interest, the co-operative research into this disease carried out by the United States and Canadian scientists which resulted in the preparation of a vaccine of a new type which is now being tested in the field in Africa and China.

The successful control of rinderpest in Tanganyika since 1938 was due to the whole-hearted collaboration of all the southern states of Africa and it was noted that similar action has been

FIG. 1.

Oblique fracture of the Os Suffraginis with marked displacement. A great deal of new fibrous tissue surrounds the sesamoids.

FIG. 2.

Antero-posterior radiograph of the same subject as Fig. 1 showing the fracture but not the displacement. Arrow marks the fracture.

FIG. 3.

Vertical fracture of the Os Suffraginis shown at F. The small arrows point to the enormous periosteal proliferation.

FIG. 4.

Lateral aspect of same subject as Fig. 3. The vertical fracture is not visible, but there is a suspicion of fracture across the mid-shaft; and a great deal of periosteal proliferation.

FIG. 5.

Normal pastern of a horse, presented for purposes of comparision with Fig. 4. The position of the navicular bone is well depicted.

FIG. 6.

Periostitis of the Os Suffraginis with proliferation following a supposed blow and small wound. Very thick fibrous tissue surrounded the whole bone. No fracture was discernible in any of the radiographs.

FIG. 7.

Lateral view of the same subject as Fig. 6 printed extra deeply in order to show the periosteal proliferation

arranged between the British and French Colonial authorities in West Africa.

There are, however, other diseases responsible for very heavy losses of livestock, and the co-operative effort in the laboratory and in the field applied to rinderpest could usefully be extended to the study and control of some of the major causes of wastage in animals.

Relationship of F.A.O. to Existing Veterinary Organizations

(*a*) *Imperial Bureau of Animal Health and Related Bureaux.*—The Conference noted with satisfaction that the Imperial Agricultural Bureaux have indicated their willingness to place at the disposal of F.A.O. their abstracting services and publications. In view of this position and the activities of abstracting services in other countries, it felt that no attempt need be made by F.A.O. to inaugurate an abstracting service for agricultural science, particularly in relation to animal health.

(*b*) *International Veterinary Congresses.*—The Permanent Committee of the International Veterinary Congresses organizes meetings normally at intervals of four years, but after the first world war twelve years elapsed before a Congress could be called together. The hope was expressed that through the instrumentality of F.A.O. the holding of the next Congress may not be unduly delayed.

(*c*) *Office International des Epizooties.*—This Office was established in 1924 and now comprises 43 adhering countries. Its permanent committee, constituted of delegates of each adhering country, normally meets annually to discuss matters of scientific and administrative interest in the veterinary sphere. In addition, it publishes regularly a statistical review of the state of epizootic diseases in different countries and a Bulletin containing the proceedings of the annual meetings, special articles, reports, abstracts, and laws and regulations made by adhering countries on the subject of the control of diseases of animals and importation of livestock and livestock products.

The Conference was convinced of the importance of the work performed by this Office and requests F.A.O. to extend its support to this Office so as to enable it to pursue and extend its activities in close co-operation with other existing international organizations, in the field of veterinary science and public hygiene. It wished again to emphasize the need for international co-operation in scientific research and would suggest that this aspect be further examined by F.A.O.

(*d*) *South-West Pacific Area Veterinary and Livestock Secretariat.*—The Conference wished to direct the attention of F.A.O. to the establishment by U.N.R.R.A. in December, 1945, at Sydney, of this Secretariat, the primary object of which was to deal with conditions arising from the war in that area. The Conference recommended that F.A.O. examine the advisability or otherwise of continuing the Secretariat when once the primary functions have been fulfilled. Whilst occasion may arise from time to time to consider the setting up of a regional secretariat for a specific purpose, the importance of maintaining a single international organization to deal with all matters affecting epizootic diseases was stressed.

In view of the importance of veterinary science as an aid to F.A.O. in furthering its aims and in order to enable F.A.O. to give effect to the views of this Conference, *it strongly recommended that a Standing Committee on Animal Health, consisting of veterinarians, be set up by F.A.O.* This Standing Committee would be available to advise F.A.O. on all technical matters affecting animal health and their application, and would also act as liaison between F.A.O. and the international veterinary organizations. At the same time, it is desirable that countries not yet adhering to the Office International des Epizooties should be asked to join this organization.

The Standing Committee would also keep itself informed of the progress of work carried out on behalf of the World Health Organization on diseases of animals transmissible to men.

Finally, the Conference considered that the adequacy of the existing veterinary services in certain countries might be reviewed by the Standing Committee on Animal Health.

D. A. E. Cabot,
Chairman.

London, *August 15th*, 1946.

At the Copenhagen Conference of F.A.O. the report of the *ad hoc* Veterinary Committee was referred to the Standing Committee on Agriculture, which approved the recommendations, but suggested that, in view of the close relationship between animal health and other livestock problems, the Standing Veterinary Committee might be part of the Standing Committee on Agriculture.

Farm Buildings in North America. *Agriculture Overseas: Report No. 2.* H.M. Stationery Office: 1946: 9d. net. (22 pp.).

This is the report of the Mission which was sent to the United States and Canada on the recommendation of the Farm Buildings Committee of the Ministry of Agriculture for the purpose of studying farm buildings in those countries.

The report deals with all classes of farm buildings and installations. Detailed descriptions are not given, but it is stated that plans and specifications collected during the tour are in the possession of the Ministry. It was noted that the general practice in farm building layout in North America is quite different from that which pertains in this country. There, the practice is to erect a building for, say, dairy cows, which will also provide accommodation for, and the processing of, food required by the stock while they are housed. The advantages and disadvantages of this comprehensive stock-plus-food building are discussed in the report.

Another matter of general importance on which the report makes comment is the wide use of electricity on farms. The Mission is of the opinion that perhaps the most important result of cheap electricity in the countryside is in the mental, as well as the physical, revolution which it has effected. In the Mission's opinion, too, nothing will do more to enhance the efficiency of British farming than the widespread provision of cheap electric power.

Several *differences* between the typical "cowbarns" of North America and our cowhouses are noted. These include wider spans (up to 40 feet); the almost universal installation of feeding passages, which usually exceed four feet in width; the wide use of overhead conveyors for food and litter; narrower and deeper dung channels than is customary in Britain; more elementary drainage from the cowhouse, which is associated with the fact that washing down the building is generally less frequent and less thorough (the comment is made that this latter undoubtedly saves labour, and promotes the comfort of the cows which are not required to stand or to lie on wet, cold concrete); wider stalls, four feet or more being allowed per single stall for cows of the larger breeds, it being claimed that single and wider stalls reduce the number of damaged udders and teats. Differences are also noted in the types of mangers in use, method of ventilation and lighting and the provision for the cooling of milk.

The Mission saw a number of "walk-through" milking parlours in which the operator works on a floor two and a half feet below the floor of the stall, so that the udder is at a convenient height for examination and the attachment of teat cups. In one type there was a wall between the operator and the cows, with holes through which udders were seen and reached. In the report it is stated that there is no real need for a separating wall, but otherwise the two-level milking parlour results in a considerable saving of human effort.

The general practice in North America is to house calving cows, calves and occasionally even bulls, in the barn which accommodates the dairy herd, by providing a series of pens of varying sizes.

Other items briefly dealt with under separate headings include: accommodation for beef cattle, pigs and poultry; silos; storage buildings; materials and methods of construction; ventilation and insulation; farmstead layout; and rural refrigeration and heating.

The recommendations of the Mission for trial in Great Britain include the following: mechanical cleaners for cowhouse gutters; the "Hoard's Dairyman" stall; the "sweep-in" manger; two-level milking parlours; various methods of feeding rationed foods to varded cows; expanded metal floors for calf boxes; and electric brooders for pigs.

N. J. S.

ARTIFICAL INSEMINATION

In the September issue of *Veterinary Medicine* (Chicago) it is recorded that on January 1st, 1946, there were 73,293 herds containing 579,444 cows enrolled in artificial insemination associations. The growth of such associations during 1945 was rapid, the increase in the number of herds being 31,273 and in cows 237,465. Wisconsin ranks first among the states in the number of cows enrolled. The number of bull associations decreased by 30 per cent. in 1945, owing to absorption by artificial insemination associations.

Hampshire Cattle Breeders' Society report that from January 1st to July 31st a total of 3,106 new cows were inseminated at their Lyndhurst and Andover stations, making a total of 4,853 since the Society commenced operations in February, 1945. Births of calves notified include: Guernseys, 171 bulls and 162 heifers; Shorthorns, 188 bulls and 148 heifers.

Packed in ice-filled vacuum flasks, supplies for the artificial insemination of 100 Jersey cows reached Australia from a Pennsylvanian stud farm after a six-day flight around the world via Britain.—*Reuter.*

QUESTIONS IN PARLIAMENT

Penicillin

Sir John Mellor asked the Minister of Supply whether he is satisfied that sufficient penicillin is now available for United Kingdom requirements; and whether he will revoke the Control of Penicillin (No. 1) Order, 1946 (S.R. & O., 1946, No. 731).

The Minister of Supply (Mr. John Wilmot): No, Sir. Although the supply position has improved considerably, the removal of control measures would not be justified at present. The scope of the Order is, however, being extended, as from November 1st, to allow registered veterinary surgeons to acquire supplies of penicillin.

Sir J. Mellor: Are we not now exporting penicillin? Can the right hon. Gentleman say why it should be a criminal offence to ask a chemist for penicillin without tendering an approved prescription?

Mr. Wilmot: I am advised that it would be most undesirable to allow penicillin to be used indiscriminately. It is better, for the time being, that control should be maintained.

Sir J. Mellor: Will the right hon. Gentleman answer the first part of my supplementary question? Is not penicillin now being exported?

Mr. Wilmot: Yes, Sir, it is.

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Animals (War Use)

Mr. Peter Freeman asked the Secretary of State for War the number of carrier pigeons, dogs, horses and other animals which were used by the Army during the war; and what was the approximate number of casualties involved in each case.

Mr. J. Freeman: As the reply consists of figures and relevant detail, I will, with permission, circulate it in the Official Report.

Mr. Peter Freeman: Will my hon. Friend consider the desirability of consultation with the Secretary of State for War, with a view to erecting or arranging for a suitable memorial to the animals who gave their lives for the Allied cause during the war?

Mr. Freeman: I would like notice of that question.

Following is the reply:—

The number of carrier pigeons fluctuated considerably due to breeding and to losses from natural causes. The peak total in use by Royal Signals was 157 lofts in all theatres of war, containing in all about 15,700 pigeons. Losses from enemy action were infinitesimal. The number of animals employed by the Army in all theatres during the war amounted to the following (figures are approximate):—

Horses	40,000
Mules	120,000
Bullocks	6,000
Camels	16,000
Dogs	5,000

These figures, apart from dogs, represent riding and transport animals and do not take into account the millions of cattle, sheep and other slaughter-stock handled by the Army prior to being used as food for the troops. Comprehensive figures of casualties would take some time to collect, particularly those relating to the Far East, where animals were most extensively used, but it can be stated that battle mortality represented only a very small proportion of the total.

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Horse-drawn Traffic, London

Air-Commodore Harvey asked the Minister of Transport what arrangements he is making to withdraw horse-drawn traffic from the more congested streets of London.

The Minister of Transport (Mr. Barnes): I propose to ask the London and Home Counties Traffic Advisory Committee to advise me how best the congestion in the streets of London can be relieved, and I have no doubt it will deal with the subject of horse-drawn traffic. That Committee, as the hon. Member will recall, is fully representative of all the major interests likely to be affected.

Air-Commodore Harvey: Is the right hon. Gentleman aware that four months ago he said that this matter was under consideration, and as it cannot be allowed to continue like this for very much longer, will he kindly hasten it along and get an early decision?

Mr. Barnes: The hon. and gallant Member will recollect that the London and Home Counties Advisory Committee was suspended during the war. I took the earliest opportunity to revive it.

Mr. Keeling: As the Minister has recently approved the initiative of Westminster in closing certain streets to through traffic in the interests of children, ought it not to be even easier to close other streets to all horse traffic?

Mr. Barnes: There are rather wider repercussions in the closing of streets to horse-drawn vehicular traffic which require much deeper consideration.

Mr. Wilson Harris: Will the right hon. Gentleman draw the attention of the Committee to the congestion caused by the large number of horse-drawn railway vans in the neighbourhood of the great termini on the Euston Road?

Mr. Barnes: I have no doubt they will take that into consideration.

Mr. Bowles: Will the right hon. Gentleman also ask the Committee to go into the question of prohibiting right-hand turns and forcing left-hand turns only, in view of the great deal of congestion caused by turning right across the roads?

Mr. Barnes: That is rather a different issue.

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Dublin Horse Show (U.K. Invitation)

Sir W. Smithers asked the Under-Secretary of State for Dominion Affairs why, in the interests of horse breeding and international goodwill, Great Britain was not represented at the Dublin Horse Show.

Captain Stewart: I have been asked to reply. An invitation was received by the United Kingdom Government to send a team to take part in the international military jumping competitions at the Dublin Horse Show, but, largely as a result of war conditions, the formation and training of a representative team was considered to be impracticable on the present occasion. The invitation had therefore, unfortunately, to be declined.

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Animal Experiments (Conviction)

Mr. Viant asked the Secretary of State for the Home Department whether Dr. E. G. T. Liddell, whose appeal against his conviction for causing unnecessary suffering to cats at Oxford University was dismissed by the Recorder on October 9th, was the holder of a certificate covering experiments for the alleviation of cat distemper, and, if so, the nature of the certificate and when it was issued.

Mr. Ede: Dr. Liddell holds the certificates under the Act of 1876 authorizing him to conduct certain experiments with a view to the study of nervous diseases in man or animals. He was convicted not for any offence in the performance of these experiments, but under the Protection of Animals Act, 1911, for causing unnecessary suffering by keeping in a compound too many cats while they were suffering from distemper.

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Empire Scientific Co-operation

Sir G. Fox asked the Lord President of the Council what steps are to be taken to improve the arrangements for scientific co-operation within the Empire, as a result of the recent conferences in London.

Mr. H. Morrison: The Royal Society Empire Scientific Conference and the Official Conference which followed it have both approved recommendations for the improvement of facilities for scientific co-operation. Their implementation calls for action partly by various scientific bodies and partly by the Government concerned. A Standing Committee has been set up by the Official Conference to facilitate Government action, and its report is awaited.

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Wheat Imports

Mr. Byers asked the Minister of Food the total quantity of wheat required to be imported in the next 12 months to satisfy the full requirements of the British human and animal consumption; and what efforts have been made to achieve this amount.

Dr. Summerskill: The quantity of wheat and flour required to be imported into the United Kingdom during the crop year August, 1946, to July, 1947, to satisfy the full estimated requirements for human consumption is 206½ million bushels (5,531,000 tons) wheat equivalent. A substantial part of this quantity has been secured, and I am making every endeavour to obtain the balance with due regard to the needs of other wheat importing countries. No wheat is imported for animal feeding.

Mr. Godfrey Nicholson: I assume that in arriving at that figure the hon. Lady has estimated the precise wheat harvest in this country. Can she say what that figure is?

Dr. Summerskill: We have not exactly estimated it; this is a rough estimate.

Mr. Byers: Is the hon. Lady making any effort at all to

increase importation, in order to allow for an increase in the allocation of pig and poultry feeding-stuffs in this country?

Dr. Summerskill: The total secured to date is made up as follows: Canada, 160 million bushels; Australia, 28 million; Argentine, 0·6 million; the United States, 14·4 million. I hope I have been able to satisfy the hon. Gentleman that we are trying.

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Non-millable Wheat

Commander Maitland asked the Minister of Agriculture whether he is aware that in certain cases dealers have not been able to accept large quantities of non-millable wheat and that some farmers have had in consequence certificates for amounts larger than they themselves can use as feeding-stuffs; and whether he will take immediate steps to ensure that the surplus can be disposed of legitimately and used to help overcome the present shortage of feeding-stuffs.

Mr. T. Williams: No, Sir. I have no knowledge of the existence of any such state of affairs as the hon. and gallant Member describes. I am, of course, fully aware of the importance of securing the maximum possible quantity of non-millable wheat for inclusion in feeding-stuffs rations, and instructions to secure this objective have been issued by my Department and the Ministry of Food.

Commander Maitland: If I send the right hon. Gentleman details will he look into the matter, and will he say what the farmer has to do when the situation arises?

Mr. Williams: I will certainly look into any case the hon. and gallant Member cares to submit.

Mr. Hurd asked the Minister of Agriculture how much wheat was so damaged in harvesting that it is likely to be graded as non-millable; and whether he will allow poultry farmers supplying egg packing stations to buy this wheat together with an allocation of fish meal to make a balanced ration for laying hens.

Mr. T. Williams: It is not yet possible to give an estimate of the total amount of non-millable wheat which this year's harvest is likely to produce. As regards the latter part of the Question, growers whose wheat is certified as non-millable are normally permitted to retain at least a proportion of the crop for feeding to their own stock; any non-millable grain not so retained must be sold for inclusion in the national pool of feeding-stuffs and is available for purchase by poultry keepers and other stock owners as part of the rations for which they are eligible under the rationing scheme.

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Vivisection

Mr. Peter Freeman asked the Secretary of State for the Home Department whether he will now state when his Department's return of licences granted, and experiments on living animals performed, under the Cruelty to Animals Act, 1876, for the year 1945 will be available.

Mr. Ede: I am not in a position to say when the publication of the annual return will be resumed but 2,240 persons held licences in 1945, of whom 1,461 performed experiments during the year as follows:—

Under Licence alone	6,350
Under Certificate A	1,124,816
Under Certificate A+E	3,304
Under Certificate A+F	376
Under Certificate B	39,387
Under Certificate B+EE	258
Under Certificate B+F	15
Under Certificate C	1,190
	1,175,696

Of these experiments 11,430 were performed in the course of cancer research.

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Milk Production

Sir H. Morris-Jones asked the Minister of Agriculture what is the total production of milk per annum; and the quantity for the last pre-war year.

Mr. T. Williams: The estimated total quantity of milk produced, including milk fed to livestock, in England and Wales in the year ended May 31st, 1945, was 1,402 million gallons, and that for 1945-46 is provisionally estimated at 1,444 million gallons. The corresponding figure for 1938-39 was 1,463 million gallons.

NOTES AND NEWS

Diary of Events

Nov. 2nd.—Joint Discussion Meeting of the Biochemical Society and the Society for General Microbiology, in the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, 11.15 a.m.

Nov. 4th.—Meeting of the Farmers' Club at the Royal Empire Society, 2.30 p.m. (Mr. J. G. Stewart: "Protein Food Production.")

Nov. 5th.—R.C.V.S. Animal Management Examination, commencing in London.

Nov. 5th.—Meeting of the Southern Counties Division, N.V.M.A., at Eastleigh (Four Counties Bacon Factory), 1.45 p.m.

Nov. 7th.—Meeting of the Central Veterinary Society, at the Royal Veterinary College, Camden Town, N.W.1, 2 p.m.

Nov. 7th.—Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries (Station Hotel), 2 p.m.

Nov. 8th.—Meeting of the Mid-West Division, N.V.M.A., at Bath ("The Red House"), 2.15 p.m.

Nov. 8th.—Meeting of the N.V.M.A. Overseas Services Committee, at 36, Gordon Square, W.C.1, 2 p.m.

Nov. 9th.—Annual Meeting of the Society of Women Veterinary Surgeons, at the Holborn Restaurant, High Holborn, W.C.2, 11.15 a.m. As indicated in our Notices Column, luncheon in the Restaurant will be followed by an X-ray talk and demonstration by Mr. Gordon C. Knight, at the Royal Veterinary College.

Nov. 13th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

Nov. 13th.—Meeting of Association of Veterinary Teachers and Research Workers (Founder Members, Northern Region) at Liverpool (44, Bedford Street North), 2.30 p.m.

Nov. 22nd.—Meeting of the Veterinary State Medicine Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 11.15 a.m.

Nov. 22nd.—Scientific Meeting of the Institute for the Study of Animal Behaviour, Regent's Park, N.W.8, 4 p.m.

Nov. 29th.—Meeting of the Royal Counties Division, N.V.M.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.

Dec. 3rd and 4th.—R.C.V.S. Written Examinations begin.

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New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

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The Carriage of Dog Carcases by Rail

The attention of the N.V.M.A. has recently been drawn to a ruling of the Railway Clearing House that the carcases of dead dogs will no longer be accepted for transit by passenger train, unless they are enclosed in a strong sealed case. Enquiries made by the Association make it clear that the Railway Clearing House is acting within its rights in making this decision, which they base on the fact that passenger trains have to carry a wide assortment of commodities including live dogs, which must be protected from contamination by carcases.

Although the instruction concerning the carriage of dead dogs has, apparently, been in existence for about a year, it is evident that officials at railway stations not yet fully conversant with the amended regulation continue to accept "improperly packed" dog carcases for transit. As the instruction becomes better known, refusal to accept carcases may become more common.

The purpose of this note is to warn practitioners of the position and to advise them, when they have dog carcases for transportation, to pack them in accordance with the above regulation before they present them for transit.

An Association of Veterinary Teachers and Research Workers

Experience has proved that there is both room for and value in the sectional grouping of members of the profession side by side with their association in geographical units. We welcome, therefore, the above latest addition to the steadily growing list of such societies: as indicated in our Notices column this week, the organization of the Association of Veterinary Teachers and Research Workers will have a regional basis, this being decided upon at the inaugural meeting held in London during Congress Week, the proceedings at which will be reported in the *Supplement* issued with next week's number of the *Record*.

We wish the venture every success under its first President, Professor J. G. Wright. In one important respect it is breaking fresh ground: the emergence of our veterinary teachers, at long last, as an organized body is an interesting development, clearly of considerable moment. An excellent start has been made, having intimated Mr. D. L. Hughes, the Hon. Secretary, that approximately 100 members of the profession engaged in teaching and investigational work, desire to join the new Association. Other intending applicants should write to him at "Willowbrook," Fiskerton, nr. Newark, Notts.

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PERSONAL

Dr. W. R. Wooldridge, Scientific Director of the Veterinary Educational Trust, has been elected Chairman of the Finance and General Purposes Committee of Birkbeck College and Vice-Chairman of the Committee of its Governors.

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Degree in Physiology.—The University of London has announced that Mr. J. D. Biggers, B.Sc. (Vet. Sci.), M.R.C.V.S., of the Physiology Department, Royal Veterinary College, has been awarded the B.Sc. (Special) Degree in Physiology with second-class honours.

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Retirement.—The Northern Scot reports that one of the best known veterinary surgeons in the North of Scotland, Mr. George W. Rutherford, M.R.C.V.S., Forres, has retired. He has been in practice in the town for almost 40 years. After graduating at the "Dick" College, Mr. Rutherford went to Forres in 1905 as assistant to the late Mr. James Tait. Three years later he took over the practice.

Mr. Rutherford takes a keen interest in sport and is one of the original members of Forres Angling Association. He is also a member of Forres Curling Club and an enthusiastic horticulturist.

The practice has been taken over by Mr. John Suttie, M.R.C.V.S., Inglewood, Forres, who is president of the Forres Junior Farmers' Club.

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Forthcoming Marriage.—McTaggart—Jackson.—The engagement is announced between Hugh Scott McTaggart, B.A., B.Sc., M.R.C.V.S., elder son of Mr. and Mrs. H. H. McTaggart, 10, Eden Lane, Edinburgh, 10, and Mary Iselle Jackson, C.S.P., younger daughter of Mr. and Mrs. Edmund H. Jackson, 12, Woodbine Terrace, Leeds, 6.

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R.C.V.S. OBITUARY

Reynard, James Napier, Manuel House, Linlithgow. Graduated Glasgow, July 13th, 1914. Died October 19th, 1946.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Sheep Scab:

Westmorland.—High Howe and Widewath Mill, Bampton, Penrith, Cumberland; Keld Head, Heltondale, Penrith, Cumberland (Oct. 22nd).

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VETERINARY EDUCATIONAL TRUST

The Veterinary Educational Trust has awarded an undergraduate studentship for £100 to D. Alan Hughes, Elthorn's Farm, Burton Point, Wirral, Cheshire, who is studying at the Liverpool University Veterinary School.

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Rapid changes are going on at the Newmarket equine research station but it will be fully three months before the station can function in any way.

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Sixpence extra charged on racecards at the recent Ascot race meeting has raised £1,100 for the Trust. By the same methods the Trust benefited to the extent of £320 from the sale of cards early in October.

Dog lovers in Southampton have contributed £6 7s. 6d. to the Trust.

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At the recent show held at Reading under the auspices of the English Jersey Cattle Society, at which there were over 200 entries, "Warnerd Puffin" owned and bred by Mr. Horace Bell, M.R.C.V.S., of Maidenhead, was awarded second prize in the class for heifers born between January and June, 1945.

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PROTECTION OF TITLE: A GOOD OMEN?

It is earnestly to be hoped that if and when our legislators are asked to defend from unjustifiable encroachment the professional title "veterinary surgeon"—and its counterpart "veterinary practitioner"—they will have in mind the short shrift recently accorded in the House of Commons to the Prayer to annul the Nurses' Amendment Regulations, 1946, depriving Christian Science nurses of the right to call themselves nurses unless they have the medical qualifications required of other people entitled to use the term "nurse."

After Mr. Fred Messer had reminded the House that the Nurses' Charter would be meaningless if any untrained person could claim the title, Mr. Bevan, Minister of Health, said that the Nursing Act of 1943 would be of no value if he allowed an exemption to Christian Science nurses to style themselves nurses. The whole purpose of the Act was to make the term "nurse" sacrosanct.

The prayer to annul the regulation was defeated by 245 votes to 43.

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VICTORIA VETERINARY BENEVOLENT FUND

In Memory of Dr. Fred Bullock

Sixth List.

Donations gratefully received from:— Mr. E. G. Conisbee; Association of Veterinary Inspectors; Mr. G. A. Tomlin.

	£	s.	d.
Amounting to	4	12	6
Previous lists	166	5	6
	£170	18	0

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

Notice to Correspondents

The Editorial Committee regrets that, the paper supply situation having deteriorated, it has become necessary to ask correspondents again to accept a limitation on the length of letters submitted for publication. Accordingly, contributors to our Correspondence Columns are requested to note that, until further intimation is made, their communications must not exceed 350 words.

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STRONGYLOSIS AS AN UNSOUNDNESS

Sir,—In the report of a discussion on examination of the horse for soundness, published on October 5th, I was surprised to note that there had been no mention of strongylosis as an unsoundness of the horse. To my mind it is quite on a par with such phenomena as strained tendons, and I should not dream of giving any horse showing clinical symptoms of infection with strongyles (*e.g.*, injected membranes, a harsh staring coat) a sound certificate without a microscopical examination of the faeces.

Yours faithfully,

Chipping Norton, Oxon. Paul Crosfield.

October 27th, 1946.

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THE R.C.V.S. FELLOWSHIP DIPLOMA

Sir,—Now that some interest is being taken in veterinary education, is it not time that some revision was made in the granting of the Fellowship diploma?

As at present constituted it is more of a research qualification, whereas, in my opinion, it would be better if it were on the lines of the F.R.C.S., and M.R.C.P., and awarded for a high degree of proficiency in one of the various branches of professional work. This would encourage postgraduate study by practitioners and would lead to a higher standard of practice, and an improvement in the prestige in the profession as a whole.

Yours faithfully,

285, Heaton Road, W. Colin Welsh.

Newcastle-on-Tyne, 6.

October 24th, 1946.